Multi-County Goods Movement Action Plan

Technical Memorandum 6a:
Evaluation of Initial Goods Movement Strategies

Prepared for:

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Introduction

This Technical Memorandum, Technical Memorandum 6a (Tech Memo 6a) presents the initial results of Task 6 of the Multi-County Goods Movement Action Plan (MCGMAP). The purpose of this task of the MCGMAP is to identify and investigate a wide range of transportation options to address the identified issues, challenges and problems related to goods movement within the MCGMAP Region. The identification and investigation of transportation options will result in a list of projects and strategies that will be incorporated into the Action Plan. This Technical Memorandum outlines the first of two phases to identify and investigate the various projects and strategies that will be refined for incorporation into the Action Plan. This first phase focuses on a screening level evaluation of a wide range of projects and strategies.

This Tech Memo documents the development of the comprehensive list of projects and strategies, the development of evaluation criteria and associated methodologies for evaluation, and the results of the initial screening. At the conclusion of this Tech Memo, a refined list of projects and strategies is presented. These projects and strategies will be subject to a detailed evaluation, according to the developed evaluation criteria presented herein, which will be documented in the subsequent Tech Memo 6b. Following the detailed evaluation, a list of projects and strategies with associated evaluation results (both detailed and qualitative) will be available for use in the MCGMAP. The Action Plan will be developed with an understanding of the projects and strategies, and the evaluation results will provide the means for comparison.

Role of Scenarios in Project and Strategy Evaluation

As stated above, the purpose of this Task is to identify and investigate a wide range of transportation options to address the identified issues, challenges and problems related to goods movement within the MCGMAP Region. The projects and strategies discussed in this Tech Memo represent options above and beyond those options currently included in the committed funding plans of the MCGMAP project partners. As discussed in Tech Memo 4a, the committed funding plans of the MCGMAP project partners represent one of the four scenarios investigated as a part of the MCGMAP. The scenarios (from Tech Memo 4a) are:

- Scenario 1: High Growth - Current Investment Levels
- Scenario 2: Low Growth – Current Investment Levels
- Scenario 3: Moderate Growth - Current Investment Levels
- Scenario 4: High Growth - Full Investment Levels

Specifically, the committed funding plans of the MCGMAP project partners represent the "current investment levels" specified under Scenarios 1, 2, and 3.

The "full investment levels" would require additional investment beyond the existing committed funding plans of the MCGMAP project partners; which is exactly what this Tech

Memo summarizes. Therefore, the projects and strategies described in this Tech Memo are assumed to be implemented under Scenario 4: High Growth - Full Investment Levels.

Note that under the "current investment level" scenarios, the MCGMAP Region's infrastructure and goods movement system would perform differently. As summarized in Tech Memo 4b, future highway and rail system performance will deteriorate if the "high growth" of international container cargo occurs while maintaining "current investment levels." When the existing system performance is reviewed, as summarized in Tech Memo 3, it is clear that the existing system performs at constrained levels under significant daily and peak hour congestion. Therefore, it can be concluded that if "current investment levels" are maintained, any additional growth in highway and rail volumes will result in further degraded system performance as well as the associated environmental and community impacts. Tech Memo 4a clearly showed that even if the significant growth in international container cargo is offset through diversion to other Ports or other factors (e.g. changes in trade policy, global unrest), there would still be growth at the Ports of Los Angeles and Long Beach and associated growth in volumes on the MCGMAP Region's rail and highway system. In conclusion, the scenarios assuming "current investment levels" would result in impacts to both system performance and the MCGMAP Region's environment and communities.

Qualitative Evaluation of Projects and Strategies

The purpose of the qualitative evaluation of projects and strategies is to provide an overview of the various effects of different goods movement projects and strategies. This qualitative evaluation is not meant to be a final technical analysis of the effects of various goods movement projects and strategies. The results of this qualitative evaluation will serve as guidance for the further planning and analysis of goods movement projects. The results of the qualitative analysis, combined with the more detailed analysis, will provide the project team with the information necessary to identify the recommended Action Plan. All results presented in subsequent sections serve as stand-alone analyses, and do not take into account the additive benefits or impacts when combined with other goods movement projects or strategies.

The categories of projects described above were evaluated based on the following criteria. The criteria were developed through coordination with the TAC and by comments received through stakeholder outreach. The qualitative evaluations presented later in this document reflect that many of the evaluation criteria could be grouped into broader categories:

Results of the Initial Screening

The detailed evaluation will focus on those projects and strategies that can be quantifiably evaluated using analytical tools (such as travel demand models, economic models, and GIS tools). The methodology for detailed evaluation (including the type and application of travel demand modeling and other software) was determined through the coordination of a Modeling Working Group. The Modeling Working Group was composed of members of the TAC and key modeling staff from the various project partners. For the purposes of this

project, the Modeling Working Group identified a set of projects and strategies for evaluation using the Regional Travel Demand Model. The initial objective was to perform a detailed evaluation of a set of projects and strategies that would have regional effects and could be compared across consistent criteria.

The 15 projects and strategies to be included in the Action Plan come from the qualitative evaluations, with the results of the qualitative evaluation used as a method of comparison. The additional data gathered through the detailed evaluation of projects and strategies will allow for a more in-depth comparison of various projects and strategies.

The projects and strategies are:

1. Expansion of On-Dock Rail at Ports
2. Additional Intermodal Facilities / Freight Yards
3. Increase Port/Rail Yard Freight Capacity
4. Implement Alternative Technologies to Additional Intermodal Terminals
5. Mainline Rail Capacity Improvements
6. Modification of Port Hours of Operation / Delivery Hours
7. Modification of Construction of Exclusive Truck Lanes
8. Allow Use of LCVs on Dedicated Facilities
9. Rail Grade Separations and Grade Crossing Safety Upgrades
10. Application of ITS Technology for Vehicle Management and Routing
11. Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel
12. Data and Analytical Methods
13. Institutional Changes to Improve Feasibility of Large Scale/Mega Projects
14. Additional Freeway Lanes/Capacity
15. Additional Freeway Operational/Safety Improvements

Chapter 1 – Initial Goods Movement Strategies

Initial List of Projects and Strategies

In order to identify the projects and strategies to improve goods movement in the MCGMAP Region, a comprehensive list of all projects identified by the public and private sector was first compiled. This list was compiled based on published lists of projects provided by the various County Transportation Commissions and public Agencies, as well as initial lists provided by private industry stakeholders. In addition, the Consultant Team identified projects based on documented existing system constraints described in Tech Memo 3.

An initial list of the types of projects and strategies that could improve the movement of goods was identified by the project partners based on the existing and forecast future system constraints. This list focused on specific modes or areas of the goods movement system (e.g. rail, highway, warehousing) and the integration of supply-chain components.

The specific sources for the comprehensive project list are:

- BNSF Railroad
- Caltrans District 7
- Caltrans District 8
- Caltrans District 12
- Caltrans District 11
- Caltrans Headquarters
- FHWA Intermodal Connectors
- Metro
- OCTA
- RCTC
- SANBAG
- SCAG 2004 RTP
- UP Railroad
- VCTC

The initial list of projects compiled from the sources described above included all projects, not only goods movement related projects. Therefore, the initial list of projects required an initial screening.

Expansion of the List of Projects and Strategies

With input from the Project Partners, the initial list was expanded to include identified short- and near-term projects included in County planning and programming documents. Using the input from the Project Partners, the project team further supplemented the list of projects and

strategies to include all projects identified in regional planning and programming documents (including SCAG's 2004 Regional Transportation Plan, Railroad projects, CALMITSAC, State GMAP. FHWA intermodal connectors, and all individual County-supplied projects). This resulted in a broad list of all potential projects and strategies without financial constraints.

As noted previously in this Tech Memo, the evaluation of the projects and strategies to be included in the Action Plan consists of two primary phases. The first phase serves to refine a wide range of projects and strategies into a more discrete list. This phase is accomplished through an initial screening level evaluation. The second phase consists of a more detailed evaluation that will document, to the extent of available analysis and data, the performance of various types of projects and strategies compared to a number of evaluation criteria.

The sources of the evaluation criteria used for both the initial screening and more detailed evaluation are derived from the following elements:

- Understanding of the MCGMAP Region goods movement system
- Existing issues and constraints (both environmental/community and system)
- Forecast future issues and constraints (both environmental/community and system)
- Implementation and funding constraints

Chapter 2 – Refined Goods Movement Strategies and Initial Screening

Refinement of the List of Projects and Strategies and Initial Screening

This section documents the two-step approach of refinement and initial screening of the lost of projects and strategies. Using the following initial screening criteria, the broad list of projects and strategies was refined:

1. Is the project or strategy related to goods movement?
   a. Does the project or strategy address a direct or indirect component of the goods movement system?
2. Is the project or strategy fully funded and programmed for short- or near-term implementation?
3. Is the project or strategy duplicated or a part of a similar project or strategy?

The result is a comprehensive list of 249 projects and strategies that is included in Appendix A.

The project team has identified 15 categories for the projects and strategies identified for improving the movement of goods.

1. Expansion of On-Dock Rail at Ports
2. Additional Intermodal Facilities / Freight Yards
3. Implement Alternative Technologies to Additional Intermodal Terminals
4. Addition of Mainline Rail Capacity
5. Modification of Port Operation / Delivery Hours
6. Construction of Exclusive Truck Lanes
7. Allow Use of LCVs on Dedicated Facilities
8. Additional Rail Grade Separations
9. Additional ITS Technology for Vehicle Management and Routing
10. Operational Techniques to Optimize Freight Travel
11. Improve Data and Analytical Methods
12. Implement Institutional Changes to Improve Feasibility of Large Scale/Mega Projects
13. Additional Freeway Lanes/Capacity
14. Additional Freeway Operational/Safety Improvements
15. Increase Port/Rail Yard Freight Capacity

The projects and strategies are summarized below. Note that some of the projects and strategies listed below are already implemented to some extent within the MCGMAP Region's goods movement system, while other projects and strategies are relatively new. For the purposes of the qualitative analysis, the projects and strategies described below are assumed to be in addition to any similar strategy currently in place or included in planning and programming documents.

1. **Expansion of On-Dock Rail at Ports:** Increase the capacity for the loading and unloading of direct-rail intermodal and carload rail at the port facilities; thereby reducing the need for drayage trucking from the port to near-dock or off-dock yards.

2. **Additional Intermodal Facilities / Freight Yards:** The construction of more intermodal facilities and freight yards throughout the region to reduce bottlenecks and increase the speed and efficiency of goods movement and transfer between modes.

3. **Implement Alternative Technologies to Additional Intermodal Terminals:** Use non-truck alternatives to transfer goods between the ports and intermodal terminals, thereby reducing truck volumes and associated environmental and community impacts. Some of the technologies include:
   a. Shuttle trains – Rail linkage between the ports and intermodal yards with reduced headways and higher speeds; most likely using diesel-electric or other hybrid engine technology to reduce emissions.
   b. Maglev – Zero-emission technology to move goods with reduced headways and greater speeds.
   c. Fixed guideway systems – Similar to a conveyor belt; low- to zero-emissions with reduced headways and greater speeds.

4. **Addition of Mainline Rail Capacity:** Increase the capacity of regional rail mainlines to move more goods faster and also to reduce congestion and delays for passenger service on shared freight / passenger lines.

5. **Modification of Port Operation / Delivery Hours:** Allow for the movement of goods during non-commuter peak travel periods (e.g. the existing PierPass off-peak program).

6. **Construction of Exclusive Truck Lanes:** Separate truck traffic from vehicle traffic on regional highways in order to reduce emissions, improve congestion and delay, and move towards a "dedicated freight guideway" system.

7. **Allow Use of LCVs on Dedicated Facilities:** Long Combination Vehicles (LCVs) allow for more goods to be carried by fewer trucks; however, these larger vehicles would require separate facilities in order to maintain passenger vehicle safety as well as reduce emissions and improve congestion and delay.

8. **Additional Rail Grade Separations:** Construct rail grade separations at locations where roadways cross rail lines, thereby reducing vehicle delays due to train crossings, reducing emissions due to idling vehicles, and reduce noise impacts from trains.

9. **Additional ITS Technology for Vehicle Management and Routing:** Improve the technology to move all vehicles through the regional system more efficiently, thereby reducing congestion, delays, and emissions.

10. **Operational Techniques to Optimize Freight Travel:** Numerous techniques are available to the public and private sectors to improve operational efficiency. This includes inventory management tools, improved efficiency in monitoring and

enforcement, and improvements to manage the shared use of passenger and freight facilities.

11. **Improve Data and Analytical Methods:** Compile more real-time statistics on the movement of goods and passengers throughout the system, allowing for better management and control of the entire multimodal transportation system.

12. **Implement Institutional Changes to Improve Feasibility of Large Scale/Mega Projects:** Strategies, such as Public-Private Partnerships (3P), can be implemented in order to make large scale projects more feasible; this would require changes to how local, regional, and State agencies do business.

13. **Additional Freeway Lanes/Capacity:** Adding capacity (most likely as new general purpose lanes) for all vehicles using the region's roadway network can reduce congestion and improve mobility for both passenger and freight traffic.

14. **Additional Freeway Operational/Safety Improvements:** Operational improvements (such as auxiliary lanes) and safety improvements (such as truck climbing lanes) can reduce congestion due to bottlenecks and improve mobility for both passenger and freight traffic.

15. **Increase Port/Rail Yard Freight Capacity:** Overall increases to the capacity of both port and rail yards would be added in order to reduce bottlenecks and improve the efficient movement of goods, thereby reducing the time spent waiting by rail and trucks for the loading/transfer of goods (most likely with an associated reduction in emissions).

For any of the projects and strategies listed above, associated environmental mitigation measures would be required. SCAG has recently released a draft study summarizing measures for mitigating the environmental impacts of goods movement, with a focus on the cost-benefit analyses of various measures. The SCAG study complements the information presented in this Tech Memo; together, these documents provide a summary of goods movement improvements and associated environmental mitigation measures with corresponding analyses. The SCAG study is titled "Analysis of Goods Movement Emission Reduction Strategies," and the Task 1 Draft Report was submitted in February 2007.

Qualitative Evaluation of Projects and Strategies

The purpose of the qualitative evaluation of projects and strategies is to provide an overview of the various effects of different goods movement projects and strategies. This qualitative evaluation is not meant to be a final technical analysis of the effects of various goods movement projects and strategies. The results of this qualitative evaluation will serve as guidance for the further planning and analysis of goods movement projects. The results of the qualitative analysis, combined with the more detailed analysis, will provide the project team with the information necessary to identify the recommended Action Plan. All results presented in subsequent sections serve as stand-alone analyses, and do not take into account the additive benefits or impacts when combined with other goods movement projects or strategies.

In order to complete the qualitative evaluation, the project team first identified a set of criteria. Next the list of projects and strategies was refined into a set of discrete elements that were suitable for incorporation in a broad strategic sense. This approach allowed for the purpose of the qualitative evaluation to be achieved.

The categories of projects described above were evaluated based on the following criteria. The criteria were developed through coordination with the TAC and by comments received through stakeholder outreach. The qualitative evaluations presented later in this document reflect that many of the evaluation criteria could be grouped into broader categories:

1. **Modal Diversion:** How much does the project or strategy shift freight from truck to rail?

2. **Highway Congestion/Delay:** How much will the project or strategy reduce highway congestion and delay for both passenger and freight movement?

3. **Rail Congestion/Delay:** How much will the project or strategy reduce rail congestion and delay for both passenger and freight movement?

4. **Travel Time/Reliability:** How much will the project or strategy improve travel time and reliability for both passenger and freight movement?

5. **Freight Trip Times - Specific Trade Lanes/Corridors:** How much will the project or strategy improve trip time for freight movement?

6. **Truck Trips - Transport Corridors:** How much will the project or strategy change truck trips along transport corridors?

7. **Truck Trips - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy change truck trips between ports, intermodal yards, and warehouse facilities?

8. **Truck Traffic Peak/Off-Peak Shares - Transport Corridors:** How much will the project or strategy shift the share of truck traffic from peak to off-peak times along transport corridors?

9. **Truck Traffic Peak/Off-Peak Shares - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy shift the share of truck traffic from peak to off-peak times between ports, intermodal yards, and warehouse facilities?

10. **Regional Vehicle Miles of Travel:** How much will the project or strategy reduce regional vehicle miles of travel?

11. **Regional Vehicle Hours of Travel:** How much will the project or strategy reduce regional vehicle hours of travel?

12. **Impact on Adjacent Corridors/Regional Balance:** How much will the project or strategy impact adjacent corridors or change the regional balance of passenger and goods movement?

13. **Overall Emissions - Transport Corridors:** How much will the project or strategy reduce overall emissions along transport corridors?

14. **Overall Emissions - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce overall emissions between ports, intermodal yards, and warehouse facilities?

15. **PM Emissions - Transport Corridors:** How much will the project or strategy reduce diesel particulate matter emissions along transport corridors?

16. **PM Emissions - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce diesel particulate matter emissions between ports, intermodal yards, and warehouse facilities?

17. **Health Effects - Transport Corridors:** How much will the project or strategy improve health effects (or reduce the current negative health effects) of goods movement along transport corridors?

18. **Health Effects - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy improve health effects (or reduce the current negative health effects) of goods movement between ports, intermodal yards, and warehouse facilities?

19. **Community Impacts - Transport Corridors:** How much will the project or strategy reduce community impacts associated with goods movement along transport corridors?

20. **Community Impacts - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities?

21. **Land Use Impacts - Transport Corridors:** How much will the project or strategy reduce land use impacts associated with goods movement along transport corridors?

22. **Land Use Impacts - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce land use impacts associated with goods movement between ports, intermodal yards, and warehouse facilities?

23. **Project Revenue/User Fees:** How much will the project or strategy maximize project revenue or user fee generating potential?

24. **Regional Economic Output/Competitiveness:** How much will the project or strategy improve the economic output and competitiveness of the region?

25. **Jobs/Economic Opportunity:** How much will the project or strategy increase the number of jobs and economic opportunity associated with goods movement in the region?

26. **Cost:** What is the overall cost of the project or strategy?

The qualitative evaluation was completed according to the following methodology:

- The list of 15 projects and strategies presented earlier in this section was revised in order to directly link specific projects and strategies to discrete components.
- Each project or strategy was evaluated independently.
- The 26 evaluation categories described above are broad; therefore, for each specific project or strategy, the evaluation category included discrete and independent components.
- Many of the projects and strategies evaluated focus on specific modes, locations, or components of the broader regional goods movement system; therefore, the evaluation results will be specific to those elements.

The categories of projects and strategies for qualitative evaluation were refined in order to identify improvement needs in a broad strategic sense. The 15 categories of projects and strategies evaluated are:

1. On-Dock Rail Improvements at Ports (projects outside of terminals)
2. Intermodal Facilities / Yards (includes Ports and rail yards)
3. Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals
4. Mainline Rail Capacity Improvements
5. Modification of Port Hours of Operation
6. Modification of Delivery Hours
7. Truck Lanes/Facilities
8. Use of LCVs on Dedicated Facilities
9. Rail Grade Separations and Grade Crossing Safety Upgrades
10. Application of ITS Technology for Vehicle Management and Routing
11. Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel
12. Data and Analytical Methods
13. Institutional Changes to Improve Feasibility of Large Scale/Mega Projects
14. Construction of Additional Freeway Lanes/Capacity
15. Freeway Operational/Safety Improvements

This evaluation was completed using available documentation, previous studies, and new analyses by the project team. In many cases the evaluations were completed through roundtable-type discussions of available data and information among project team experts. Information and data presented in previous technical memoranda (Tech Memos 2a, 3, 4a, 4b, 5a, and 5b) served as the primary basis for qualitative evaluations. A summary of the evaluation of the categories projects and strategies is included in the following pages. The evaluations use a qualitative measurement of project and strategy performance on a level from "least" to "most". A more detailed

evaluation of specific projects and strategies was performed in a subsequent task (as documented in Tech Memo 6b).

It is understood that the evaluation methodology described above will not produce results suitable for documenting project-specific environmental impacts, nor will the qualitative evaluations result in a true cost-benefit analysis of various projects or strategies. A description of the evaluation for each criteria, including a discussion of the "least" and "most" rated projects or strategies is included in the following Chapter.

The results of the qualitative evaluation are meant to offer comparisons between each project and strategy for each specific evaluation criteria. Since each project or strategy was evaluated independently, the results of the qualitative evaluation cannot be summed across all categories; therefore, the qualitative evaluation will not provide a summary of prioritized projects and strategies based on criteria.

Summary of Qualitative Evaluations
(Chart 1 of 4)

Project Category	Modal Diversion	Reduction of Highway Congestion / Delay	Reduction of Rail Congestion / Delay	Improvement of Travel Time / Reliability
On-Dock Rail Improvements at Ports (projects outside of terminals)	●	◑	◑	○
Intermodal Facilities / Yards	◑	○	◑	○
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	◑	◑	◑	○
Mainline Rail Capacity Improvements	○	○	●	●
Modification of Port Hours of Operation	○	○	○	○
Modification of Delivery Hours	○	○	○	○
Truck Lanes/Facilities	○	◑	○	◑
Use of LCVs on Dedicated Facilities	○	◑	○	○
Rail Grade Separations and Grade Crossing Safety Upgrades	○	◑	○	○
Application of ITS Technology for Vehicle Management and Routing	○	○	○	○
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	◑	○	○	○
Data and Analytical Methods	○	○	○	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◑	●	●	◑
Construction of Additional Freeway Lanes/Capacity	○	◑	○	○
Freeway Operational/Safety Improvements	○	○	○	○

Summary of Qualitative Evaluations
(Chart 2 of 4)

Project Category	Improvement of Freight Trip Times - Specific Trade Lanes / Corridors	Change in Truck Trips - Transport Corridors	Change in Truck Trips - Ports / Intermodal / Warehouse Facilities	Change in Truck Traffic Peak / Off-Peak Shares - Transport Corridors	Change in Truck Traffic Peak / Off-Peak Shares - Ports / Intermodal / Warehouse Facilities	Reduction of Regional Vehicle Miles of Travel	Reduction of Regional Vehicle Hours of Travel
On-Dock Rail Improvements at Ports (projects outside of terminals)	●	○	◑	○	○	○	○
Intermodal Facilities / Yards	●	○	●	○	○	○	○
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	●	○	○	○	○	◑	◑
Mainline Rail Capacity Improvements	●	○	○	○	○	○	○
Modification of Port Hours of Operation	○	○	○	◑	◑	○	○
Modification of Delivery Hours	○	○	○	◑	◑	○	○
Truck Lanes/Facilities	●	●	●	●	●	●	●
Use of LCVs on Dedicated Facilities	○	○	○	●	●	●	●
Rail Grade Separations and Grade Crossing Safety Upgrades	○	○	○	○	○	○	○
Application of ITS Technology for Vehicle Management and Routing	○	○	○	○	○	○	○
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	○	○	○	○	○	○	○
Data and Analytical Methods	○	○	○	○	○	○	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◑	●	●	○	○	●	●
Construction of Additional Freeway Lanes/Capacity	●	●	●	○	○	●	●
Freeway Operational/Safety Improvements	◑	◑	◑	○	○	◑	◑

Summary of Qualitative Evaluations
(Chart 3 of 4)

Project Category (Least ○ ◔ ◑ ◕ ● Most)	Impact on Adjacent Corridors / Regional Balance	Reduction of Overall Emissions - Transport Corridors	Reduction of Overall Emissions - Ports / Intermodal / Warehouse Facilities	Reduction of PM Emissions - Transport Corridors	Reduction of PM Emissions - Ports / Intermodal / Warehouse Facilities	Improved Health Effects - Transport Corridors	Improved Health Effects - Ports / Intermodal / Warehouse Facilities	Reduction of Community Impacts - Transport Corridors	Reduction of Community Impacts - Ports / Intermodal / Warehouse Facilities
On-Dock Rail Improvements at Ports (projects outside of terminals)	◔	◑	●	◑	●	◑	●	◑	●
Intermodal Facilities / Yards	◔	◔	●	◔	●	◔	●	◔	●
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	●	●	●	●	●	●	●	●	●
Mainline Rail Capacity Improvements	◔	●	◑	●	◑	●	◑	●	◑
Modification of Port Hours of Operation	◔	◔	◔	◔	◔	◔	◔	◔	◔
Modification of Delivery Hours	◔	◔	◔	◔	◔	◔	◔	◔	◔
Truck Lanes/Facilities	●	●	●	●	●	●	●	●	●
Use of LCVs on Dedicated Facilities	●	●	●	●	●	●	●	●	●
Rail Grade Separations and Grade Crossing Safety Upgrades	○	◔	◔	◔	◔	◔	◔	◔	◔
Application of ITS Technology for Vehicle Management and Routing	◔	○	○	○	○	○	○	○	○
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	○	○	○	○	○	○	○	○	○
Data and Analytical Methods	○	○	○	○	○	○	○	○	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	●	●	●	●	●	●	●	●	●
Construction of Additional Freeway Lanes/Capacity	◑	◑	◔	◑	◔	◑	◔	◑	◔
Freeway Operational/Safety Improvements	◑	◑	◔	◑	◔	◑	◔	◑	◔

Summary of Qualitative Evaluations
(Chart 4 of 4)

Project Category (Least ○ ◔ ◑ ◕ ● Most)	Reduction of Land Use Impacts - Transport Corridors	Reduction of Land Use Impacts - Ports / Intermodal / Warehouse Facilities	Maximization of Project Revenue / User Fees	Improvement of Regional Economic Output / Competitiveness	Increase in Jobs / Economic Opportunity	Cost
On-Dock Rail Improvements at Ports (projects outside of terminals)	◑	◕	◔	◕	◕	●
Intermodal Facilities / Yards	◔	◕	◔	◕	◕	●
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	●	●	●	◕	◕	●
Mainline Rail Capacity Improvements	●	◑	◕	◕	◕	●
Modification of Port Hours of Operation	◔	◔	●	◑	◑	○
Modification of Delivery Hours	◔	◔	●	◑	◑	○
Truck Lanes/Facilities	◕	◕	◕	◕	◕	●
Use of LCVs on Dedicated Facilities	◕	◕	◑	◕	◕	◔
Rail Grade Separations and Grade Crossing Safety Upgrades	◔	◔	◔	◕	◕	●
Application of ITS Technology for Vehicle Management and Routing	○	○	◔	◔	◔	◔
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	○	○	○	◕	◕	○
Data and Analytical Methods	○	○	○	◕	◕	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◕	◕	◕	◕	◕	○
Construction of Additional Freeway Lanes/Capacity	◑	◔	◔	◑	◑	●
Freeway Operational/Safety Improvements	◑	◔	◔	◑	◑	◑

Chapter 3 – Results of the Initial Screening Process

Initial Screening Highlights

Highlights of the initial screening are summarized below:

1. **Modal Diversion:** How much does the project or strategy shift freight from truck to rail?
    a. The **Most** modal diversion would occur with increased on-dock rail at the ports, with additional potential to increase modal diversion from improvements linking intermodal and freight yards through capital or operational improvements.
    b. The **Least** modal diversion would occur with projects focused on improving the movement of trucks and passenger vehicles.
        i. The biggest constraint to the movement of goods is intermodal lift capacity. Shifting freight from trucks to rail will require increased capacities and systems to allow more goods to quickly transfer from various modes (intermodal lifts); minimize the interim drayage truck movements.

2. **Highway Congestion/Delay:** How much will the project or strategy reduce highway congestion and delay for both passenger and freight movement?
    a. The **Most** reduction in highway congestion/delay would result from large scale/mega projects (such as a regional dedicated freight guideway system) to link the primary origins and destinations in the goods movement system and separate the movements between those locations from other regional travel. Therefore, the institutional changes to allow for large scale/mega projects are shown to have the most reduction.
        i. It is important to note that these institutional changes alone would not affect highway congestion or delay; however, for the purposes of this study it is assumed that these institutional changes are the necessary first-step towards implementation of these large scale/mega projects. The planning, design, construction, and operation of such large scale/mega projects would not occur without the required institutional changes.
    b. The **Least** reduction in highway congestion/delay would result from increased data and analysis of the system; with minimal reductions resulting from smaller scale improvements to the regional highway system (e.g. "spot" fixes instead of a large scale regional system).
        i. The regional highway system is currently at capacity and is forecast to continue to be capacity constrained. The passenger and freight traffic on the existing system is diffuse and extensive; solutions with the greatest benefit must be large scale and separate the traffic that travels through or leaves the region from the traffic within the region.
        ii. Truck lanes would provide a medium reduction in highway congestion and delay, with the greatest change evident to the trucks themselves. The changes to congestion and delay for vehicles traveling in the mixed-flow

lanes adjacent to the truck lanes would be minimal, as the excess capacity created by the removal of truck traffic would be quickly absorbed by the significant additional vehicle demand along corridors. In addition, the reduction to highway congestion and delays would be limited to on or surrounding the designated truck lane corridors; within the MCGMAP Region, highway congestion and delay would remain significant due to overwhelming demand.

3. **Rail Congestion/Delay:** How much will the project or strategy reduce rail congestion and delay for both passenger and freight movement?
    a. The **Most** reduction in rail congestion/delay would result from mainline rail capacity increases, with additional reduction from large scale/mega projects.
    b. The **Least** reduction in rail congestion/delay would result from those projects and strategies that do not affect rail travel.
        i. Rail capacity is the second largest constraint to the goods movement system. Additional mainline rail is necessary to improve capacity.

4. **Travel Time/Reliability:** How much will the project or strategy improve travel time and reliability for both passenger and freight movement?
    a. The **Most** improvement in travel time/reliability would result from additional mainline rail capacity; both for passenger and goods movement.
    b. The **Least** improvement in travel time/reliability would result from improvements to the regional highway system or modifications to operational systems.
        i. The goods movement network in the region shares capacity with passenger and freight traffic. The sheer demand for passenger mobility results in a highly constrained system. Although improvements to the regional network would certainly improve travel time and reliability, the improvements may not be as substantial as desired simply due to the huge demand on the system from both passenger and freight.

5. **Freight Trip Times - Specific Trade Lanes/Corridors:** How much will the project or strategy improve trip time for freight movement?
    a. The **Most** improvement in freight trip times along specific trade lanes/corridors would result from direct capacity enhancements to the specific trade lanes/corridors; with rail representing the area for maximum benefit.
    b. The **Least** improvement in freight trip times along specific trade lanes/corridors would result from increased data and analysis of the system; with limited benefit from projects and strategies not directly adding capacity.
        i. Since the majority of the goods movement within the region moves on a broad and diverse system, the most benefit would occur with improvements to those corridors where the movement of goods can be discretely targeted (e.g. rail lines).
        ii. Note that by improving the corridors where the movement of goods can be discretely targeted, the benefits of improved freight trip times will likely be discretely focused. Within the entire MCGMAP Region, changes to freight trip times would be virtually imperceptible. For the purposes of

this project, the most improvement to freight trip times would be evident on the discrete segment of the goods movement supply chain utilizing the corridor (e.g. international intermodal cargo without an origin or destination within the MCGMAP Region).

6. **Truck Trips - Transport Corridors:** How much will the project or strategy increase truck trips along transport corridors?
    a. The **Most** change in truck trips along transport corridors would result from the addition of truck lanes or facilities; with additional potential from the construction of additional mainline freeway capacity.
    b. The **Least** change in truck trips along transport corridors would result from increased data and analysis of the system; with limited benefit from projects and strategies not directly adding capacity or those that focus on rail goods movement.
        i. The region's highway system serves local, regional, and national goods movement via trucks; therefore, improvements to the region's highway system will change truck trips, and the most change would result from a dedicated system serving trucks. The best solutions will most likely require a large scale / mega project.

7. **Truck Trips - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy increase truck trips between ports, intermodal yards, and warehouse facilities?
    a. The **Most** increase in truck trips between ports, intermodal yards, and warehouse facilities would result from the addition of truck lanes or facilities; with additional potential from the construction of additional mainline freeway capacity as well as improvements and increases to intermodal facilities and yards.
    b. The **Least** increase in truck trips between ports, intermodal yards, and warehouse facilities would result from increased data and analysis of the system; with limited benefit from projects and strategies not directly adding capacity or those that focus on rail goods movement.
        i. Similar to transport corridors, the most change to truck trips between ports, intermodal yards, and warehouse facilities would result from a dedicated system serving trucks; improvements to on-dock rail and increases to intermodal facilities and yards would also change truck trips, specifically drayage truck trips associated with transloaded intermodal cargo.

8. **Truck Traffic Peak/Off-Peak Shares - Transport Corridors:** How much will the project or strategy shift the share of truck traffic from peak to off-peak times along transport corridors?
    a. The **Most** shift in the share of truck traffic from peak to off-peak times along transport corridors would result from the addition of truck lanes or facilities; with additional potential benefits from the use of LCVs on dedicated facilities.
    b. The **Least** shift in the share of truck traffic from peak to off-peak times along transport corridors would result from increased data and analysis of the system and any improvements to rail capacity.

i. The greatest shift in peak and off-peak truck travel along transport corridors would result from increased opportunities for trucks to either travel during peak hours congestion on dedicated facilities with limited congestion (e.g. truck lanes) or to allow increased volumes to travel during off-peak times (e.g. changes to operating hours).

9. **Truck Traffic Peak/Off-Peak Shares - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy shift the share of truck traffic from peak to off-peak times between ports, intermodal yards, and warehouse facilities?
    a. The **Most** shift in the share of truck traffic from peak to off-peak times between ports, intermodal yards, and warehouse facilities would result from the addition of truck lanes or facilities; with additional potential benefits from the use of LCVs on dedicated facilities.
    b. The **Least** shift in the share of truck traffic from peak to off-peak times between ports, intermodal yards, and warehouse facilities would result from increased data and analysis of the system and any improvements to rail capacity.
        i. The greatest shift in peak and off-peak truck travel a between ports, intermodal yards, and warehouse facilities would result from increased opportunities for trucks to either travel during peak hours of congestion on dedicated facilities with limited congestion (e.g. truck lanes) or to allow increased volumes to travel during off-peak times (e.g. changes to operating hours).

10. **Regional Vehicle Miles of Travel:** How much will the project or strategy reduce regional vehicle miles of travel?
    a. The **Most** reduction in regional VMT would result from the addition of truck lanes or facilities; with additional potential benefit from the addition of mainline freeway capacity.
    b. The **Least** reduction in regional VMT would result from increased data and analysis of the system; with limited benefit from any improvements to rail capacity.
        i. By concentrating truck travel along specific corridors, total congestion could be reduced resulting in changes to travel routes and an overall reduction in VMT; this would occur through capacity enhancements to the region's highway system.
        ii. Note that the MCGMAP Region's overall VMT will maintain a relatively constant level with any assumed highway or rail projects described in this Tech Memo. As a function of total lane-miles of roadway and total vehicle volumes on the regional system, total VMT will show minimal changes when considering projects and strategies located along specific routes or corridors. The qualitative evaluations presented above reflect nominal differences between the least and most reduction. The key point of this qualitative evaluation is that the greatest reduction in VMT would occur through enhancements to the highway system that allow for vehicles to utilize the most direct routes between destinations, without selecting routes based on reduced congestion levels (thereby reducing overall miles traveled). Rail capacity improvements would serve a specific segment of

the MCGMAP Region's goods moved by truck; however, a greater share of the Region's trucks would not be affected by rail capacity improvements and therefore the reduction in VMT would be limited.

11. **Regional Vehicle Hours of Travel:** How much will the project or strategy reduce regional vehicle hours of travel?
    a. The **Most** reduction in regional VHT would result from the addition of truck lanes or facilities; with additional potential benefit from the addition of mainline freeway capacity.
    b. The **Least** reduction in regional VHT would result from increased data and analysis of the system and any improvements to rail capacity.
        i. By concentrating truck travel along specific corridors, total congestion could be reduced resulting in an overall reduction in VHT; this would occur through capacity enhancements to the region's highway system.

12. **Impact on Adjacent Corridors/Regional Balance:** How much will the project or strategy impact adjacent corridors or change the regional balance of passenger and goods movement?
    a. The **Most** impact on adjacent corridors or regional balance would result from projects and strategies that enhance specific goods movement routes or corridors (such as dedicated truck facilities or advanced technologies).
    b. The **Least** impact on adjacent corridors or regional balance would result from increased data and analysis of the system; with limited impact resulting from operational improvements or location-specific improvements.
        i. By providing enhanced capacity along specific goods movement corridors or routes, goods movement traffic would be more likely to shift from adjacent corridors, while non-goods movement traffic may shift to the adjacent corridors; the net result would be noticeable changes to regional balance.

13. **Overall Emissions - Transport Corridors:** How much will the project or strategy reduce overall emissions along transport corridors?
    a. The **Most** reduction to overall emissions along transport corridors would result from alternative technologies (e.g. low- or zero-emission technologies) and improvements to the speed and congestion of goods movement throughout the region.
    b. The **Least** reduction to overall emissions along transport corridors would result from those improvements not enhancing capacity, congestion, and travel speeds.
        i. The key to reducing overall emissions along transport corridors is either maximizing the volume of low- or zero-emission vehicles (e.g. maximize the volume of goods carried by rail or "clean" emerging technologies) or by reducing congestion and delays throughout the regional system for both passenger and freight travel.
        ii. Note that the changes to overall emissions would be centered along the specific corridors utilized by the specific project or strategy; within the MCGMAP Region there would still be significant overall emissions related

to both goods movement and other sources (e.g. automobiles, stationary sources).

14. **Overall Emissions - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce overall emissions between ports, intermodal yards, and warehouse facilities?
    a. The **Most** reduction to overall emissions between ports, intermodal yards, and warehouse facilities would result from alternative technologies (e.g. non-diesel sources); with additional potential benefits from increased on-dock rail improvements and improvements to the speed and congestion of goods movement throughout the region.
    b. The **Least** reduction to overall emissions between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
        i. Similar to transport corridors, the most reduction to overall emissions between ports, intermodal yards, and warehouse facilities would be through the implementation of a low- or zero-emission technology to move goods between the specific locations; with additional benefits from increased on-dock rail at the ports and improvements to intermodal yard efficiency (e.g. reducing wait times and bottlenecks at intermodal yards).
        ii. Also similar to transport corridors, the changes to overall emissions between ports, intermodal yards, and warehouse facilities would be centered around the facilities accessed by the specific project or strategy; within the MCGMAP Region there would still be significant overall emissions related to both goods movement and other sources (e.g. automobiles, stationary sources).

15. **PM Emissions - Transport Corridors:** How much will the project or strategy reduce diesel particulate matter emissions along transport corridors?
    a. The **Most** reduction to PM emissions along transport corridors would result from alternative technologies (e.g. non-diesel sources) and a shift from truck to rail .
    b. The **Least** reduction to PM emissions along transport corridors would result from those improvements not enhancing capacity, congestion, and travel speeds.
        i. The key to reducing PM emissions along transport corridors is maximizing non-diesel technologies (e.g. maximize the volume of goods carried by rail or "clean" emerging technologies).
        ii. Note that the changes to PM emissions would be centered along the specific corridors utilized by the specific project or strategy; within the MCGMAP Region there would still be significant PM emissions related to goods movement along other routes.

16. **PM Emissions - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce diesel particulate matter emissions between ports, intermodal yards, and warehouse facilities?
    a. The **Most** reduction to PM emissions between ports, intermodal yards, and warehouse facilities would result from alternative technologies (e.g. non-diesel

sources); with additional potential benefits from increased on-dock rail improvements and improvements to the speed and congestion of goods movement throughout the region.

b. The **Least** reduction to PM emissions between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
    i. Similar to transport corridors, the most reduction to PM emissions between ports, intermodal yards, and warehouse facilities would be through the implementation of a low- or zero-emission technology to move goods between the specific locations; with additional benefits from increased on-dock rail at the ports and improvements to intermodal yard efficiency (e.g. reducing wait times and bottlenecks at intermodal yards).
    ii. Also similar to transport corridors, the changes to PM emissions between ports, intermodal yards, and warehouse facilities would be centered around the facilities accessed by the specific project or strategy; within the MCGMAP Region there would still be significant PM emissions related to goods movement along other routes.

17. **Health Effects - Transport Corridors:** How much will the project or strategy improve health effects (or reduce the current negative health effects) of goods movement along transport corridors?
    a. The **Most** improvement in health effects (or reduction in current negative health effects) of goods movement along transport corridors would result from alternative technologies (e.g. non-diesel sources); with additional potential benefits from increased on-dock rail improvements and improvements to the speed and congestion of goods movement throughout the region.
    b. The **Least** improvement in health effects (or reduction in current negative health effects) of goods movement along transport corridors would result from those improvements not reducing congestion or truck trips.
        i. By reducing the volume or congestion of truck traffic along transport corridors, alternative "clean" technologies can be implemented to improve health effects.

18. **Health Effects - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy improve health effects (or reduce the current health effects) of goods movement between ports, intermodal yards, and warehouse facilities?
    a. The **Most** improvement in health effects (or reduction in current negative health effects) of goods movement between ports, intermodal yards, and warehouse facilities would result from reducing truck trips and/or truck congestion; with additional potential benefits from improved efficiency at the ports and intermodal yards.
    b. The **Least** improvement in health effects (or reduction in current negative health effects) of goods movement between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.

i. The most improvement in health effects between ports, intermodal yards, and warehouse facilities would be through the implementation of a low- or zero-emission technology to move goods between the specific locations; with additional benefits from increased on-dock rail at the ports and improvements to intermodal yard efficiency (e.g. reducing wait times and bottlenecks at intermodal yards).

19. **Community Impacts - Transport Corridors:** How much will the project or strategy reduce community impacts associated with goods movement along transport corridors?
    a. The **Most** reduction in community impacts associated with goods movement along transport corridors would result from those projects that allow for more goods to move on systems separated from communities.
    b. The **Least** reduction in community impacts associated with goods movement along transport corridors would result from those improvements not reducing congestion or truck trips.
        i. By increasing rail mainline capacity, more trucks could be removed from local communities; also, dedicated truck facilities can separate truck traffic from passenger traffic and direct truck traffic to specific routes to separate from local traffic.
        ii. The evaluation assumes that the benefits of increased rail mainline capacity will offset the impacts; for example, the benefits due to reduced truck volumes, noise, congestion, and emissions would offset (or outweigh) community impacts associated with increased rail mainline capacity, such as increased noise and need for additional right-of-way.
        iii. In addition, the community impacts of goods movement occur along entire routes and are not unique to transport corridors. Therefore, improvements to a transport corridor may lessen community impacts in one designated segment, while having no effect on, or even increasing, community impacts at the end- or mid-points of the corridor. Increased freight volumes along improved separated corridors could also lead to increased community impacts at the end- or mid-points where loading and transloading occur.

20. **Community Impacts - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities?
    a. The **Most** reduction in community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would result from reducing truck trips and/or truck congestion; with additional potential benefits from improved efficiency at the ports and intermodal yards.
    b. The **Least** reduction in community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
        i. The most reduction in community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would be through the clear separation of goods movement systems and the local system, thereby reducing truck trips and/or truck congestion.

ii. The evaluation assumes that the benefits of separating the goods movement system from the local system will offset the impacts; for example, the benefits due to reduced truck volumes, noise, congestion, and emissions would offset (or outweigh) community impacts associated with separated facilities, such as increased noise and need for additional right-of-way.
iii. In addition, the community impacts of goods movement occur along entire routes and are not unique to ports, intermodal yards, and warehouse facilities. Therefore, improvements to the ports, intermodal yards, and warehouse facilities may lessen community impacts in one designated area, while having no effect on, or even increasing, community impacts along the corridor. Increased freight volumes along improved separated corridors could also lead to increased community impacts at the end- or mid-points where loading and transloading occur.

21. **Land Use Impacts - Transport Corridors:** How much will the project or strategy reduce land use impacts associated with goods movement along transport corridors?
    a. The **Most** reduction in land use impacts associated with goods movement along transport corridors would result from those projects that allow for more goods to move on systems separated from communities.
    b. The **Least** reduction in land use impacts associated with goods movement along transport corridors would result from those improvements not reducing congestion or truck trips.
        i. By increasing rail mainline capacity, more trucks could be removed from local communities; also, dedicated truck facilities can separate truck traffic from passenger traffic and direct truck traffic to specific routes to separate from local traffic.

22. **Land Use Impacts - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce land use impacts associated with goods movement between ports, intermodal yards, and warehouse facilities?
    a. The **Most** reduction in land use impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would result from reducing truck trips and/or truck congestion; with additional potential benefits from improved efficiency at the ports and intermodal yards.
    b. The **Least** reduction in land use impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
        i. The most reduction in land use impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would be through the clear separation of goods movement systems and the local system, thereby reducing truck trips and/or truck congestion.

23. **Project Revenue/User Fees:** How much will the project or strategy maximize project revenue or user fee generating potential?

a. The **Most** project revenue or user fee generating potential would result from those projects and strategies that target specific market segments of the goods movement system (e.g. national distribution).
b. The **Least** project revenue or user fee generating potential would result from those projects and strategies that do not serve a specific market segment or need.
    i. In order to maximize project revenues and user fees, the users must see a direct benefit in terms of productivity, reliability, efficiency, or another metric of performance.

24. **Regional Economic Output/Competitiveness:** How much will the project or strategy improve the economic output and competitiveness of the region?
    a. The **Most** improvement to the economic output and competitiveness of the region would result from projects and strategies that maintain the system for the movement of goods and associated industries throughout the region, State, nationally, and internationally.
    b. The **Least** improvement to the economic output and competitiveness of the region would result from projects and strategies that do not specifically maintain or enhance the goods movement system.
        i. In general, the region will maintain its competitive economic edge due to a number of factors (e.g. access to Asian trade, role as international gateway, large manufacturing base, large population base).

25. **Jobs/Economic Opportunity:** How much will the project or strategy increase the number of jobs and economic opportunity associated with goods movement in the region?
    a. The **Most** increase to the number of jobs and economic opportunity associated with goods movement in the region would result from projects and strategies that maintain the system for the movement of goods and associated industries throughout the region, State, nationally, and internationally.
    b. The **Least** increase to the number of jobs and economic opportunity associated with goods movement in the region would result from projects and strategies that do not specifically maintain or enhance the goods movement system.
        i. In general, the region will maintain its competitive economic edge due to a number of factors (e.g. access to Asian trade, role as international gateway, large manufacturing base, large population base). This will ensure an increase in jobs and economic opportunity; however, the region must ensure that appropriate training and opportunity is continually provided.

26. **Cost:** What is the overall cost of the project or strategy?
    a. The **Most** costly projects and strategies are those that would require large capital expenditures (e.g. right-of-way acquisition, structures) as well as those projects and strategies requiring extensive regional environmental mitigation.
    b. The **Least** costly projects and strategies are those that would not require new capital expenditures.
        i. The costs for any projects and strategies will be substantial; however, the cost can be offset by improvements in the other 25 categories mentioned above.

ii. Note that it is very difficult to prepare an equitable assessment of costs between all evaluated projects and strategies. For the purposes of this evaluation, any project or strategy that would require right-of-way acquisition (e.g. along specific transport corridors, around existing facilities) was assumed to have the most cost. Although specific costs will vary between the projects and strategies, and some projects and strategies will be substantially less cost than others or could present opportunities for cost savings (e.g. using existing utility easements for new corridor alignments), all projects or strategies requiring right-of-way acquisition will have high costs.

In addition to the initial screening described above, a more detailed evaluation of specific projects and strategies was performed. This detailed evaluation is documented in Tech Memo 6b.

Results of the Initial Screening

The detailed evaluation will focus on those projects and strategies that can be quantifiably evaluated using analytical tools (such as travel demand models, economic models, and GIS tools). The methodology for detailed evaluation (including the type and application of travel demand modeling and other software) was determined through the coordination of a Modeling Working Group. The Modeling Working Group was composed of members of the TAC and key modeling staff from the various project partners. The Modeling Working Group met a number of times in the late summer and fall of 2006 to identify 1) the approach to detailed evaluations, 2) the methodology for detailed evaluations, and 3) the specific strategies/projects for detailed evaluations. It is understood that there are many tools available to model a variety of projects and strategies. For the purposes of this project, the Modeling Working Group identified a set of projects and strategies for evaluation using the Regional Travel Demand Model. The initial objective was to perform a detailed evaluation of a set of projects and strategies that would have regional effects and could be compared across consistent criteria. Therefore, the projects and strategies to be evaluated in Tech Memo 6b are:

1. Expansion of On-Dock Rail at Ports
2. Additional Intermodal Facilities / Freight Yards
3. Implement Alternative Technologies to Additional Intermodal Terminals
4. Construction of Exclusive Truck Lanes
5. Allow Use of LCVs on Dedicated Facilities
6. Additional Freeway Lanes/Capacity
7. Additional Freeway Operational/Safety Improvements
8. Increase Port/Rail Yard Freight Capacity

The eight projects and strategies described above represent a subset of the 15 projects and strategies that will be considered for the Action Plan. The 15 projects and strategies to be included in the Action Plan come from the qualitative evaluations, with the results of the qualitative evaluation used as a method of comparison. The additional data gathered through

the detailed evaluation of projects and strategies will allow for a more in-depth comparison of various projects and strategies.

The projects and strategies are:

1. Expansion of On-Dock Rail at Ports
2. Additional Intermodal Facilities / Freight Yards
3. Increase Port/Rail Yard Freight Capacity
4. Implement Alternative Technologies to Additional Intermodal Terminals
5. Mainline Rail Capacity Improvements
6. Modification of Port Hours of Operation / Delivery Hours
7. Modification of Construction of Exclusive Truck Lanes
8. Allow Use of LCVs on Dedicated Facilities
9. Rail Grade Separations and Grade Crossing Safety Upgrades
10. Application of ITS Technology for Vehicle Management and Routing
11. Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel
12. Data and Analytical Methods
13. Institutional Changes to Improve Feasibility of Large Scale/Mega Projects
14. Additional Freeway Lanes/Capacity
15. Additional Freeway Operational/Safety Improvements